REMARKS

This Amendment is responsive to the non-final Office Action of May 11, 2011. Reconsideration and allowance of **claims 2-9, 11-12, 19, and 21-24** are requested.

The Office Action

Claims 11, 12, and 19 were objected to due to minor informalities.

Claims 11, 12, 19, and 22 were rejected under 35 U.S.C. § 112, second paragraph.

Claims 11, 12, 19, and 22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,865,253 to Blumhofer et al. (Blumhofer et al.) in view of U.S. Patent No. 5,894,503 to Shepherd et al (Shepherd et al.).

Claim Objections

Claim 11 has been amended to address the Examiner's claim objection.

35 U.S.C. § 112, Second Paragraph

Claims 11 and 22 have been amended to address the Examiner's 35 U.S.C. § 112, second paragraph rejection.

The Claims Distinguish Patentably Over the References of Record

Claims 11, 12, 19, and 22 are patentable over Blumhofer et al. in view of Shepherd et al. This rejection is hereby traversed.

Specifically, regarding **claim 11**, Blumhofer et al. does not teach or fairly suggest obtaining a first magnetic resonance image of a patient including an anatomical target and at least one fiducial marker displaced from the anatomical target, the first image being obtained at a position of the patient within said scanner where the anatomical target is located in a more geometrically accurate position and the at least one fiducial marker is located in a less geometrically accurate position. In a second MR image, the at least one fiducial marker is located in the more geometrically accurate position and the anatomeric region in the less accurate.

Blumhofer et al. teaches a method for accurately positions a patient for radiotherapy that includes taking two x-ray images of the patient and/or one of the parts of his body in the vicinity of the radiation target point from different respective recording angles on a single image recorder. The x-ray images are spatially localized and at least one reconstructed image, corresponding to each x-ray image and deriving from a three-dimensional patient scan data set is produced. The positioning error is determined electronically and/or with computer guidance by way of particular landmarks and/or the intensity gradient or the contours in the two images and the position of the patient is corrected by way of the determined positioning error. Particularly, Blumhofer et al. takes two 2D projection images from two substantially orthogonal directions and synthesizes the two projection images along the orthogonal directions. Blumhofer et al. compares the newly taken projection images each with the corresponding synthesized projection image to be sure the projection images, particularly the tumor, are aligned and, if not make appropriate adjustments.

Blumhofer et al. does not address the problem addressed by the present application, nor provides a solution. As pointed out in the present application (note for example the first half of page 2), MR images are much better than CT images at distinguishing soft tissue. But, MR images are inherently distorted due to non-linearities in the magnetic fields, applied gradients, and the like. When a large area is imaged with MR in order to get the tumor and the fiducial marks in the same image, the inherent MR distortions may be such that the relative locations of the tumor and the fiducial cannot be determined within acceptable tolerances.

The present application suggests determining an imageable region, typically round the isocenter, which has an acceptably low level of geometric distortion, termed the optimal FOV. A first image is generated with the tumor in the optimal FOV but probably not one or more fiducial markers. The patient is shifted a known distance and a second image is generated with the fiducial marker, but probably not the tumor, in the optimal FOV. Using the known shift distance, the first and second images are overlaid to create a composite image depicting both the tumor and the fiducial marker(s) all within the acceptably low geometric distortion tolerances.

Blumhofer et al. only teaches that 2D x-ray images of the patient are take from different angles and are then compared with like 2D images synthesized from the pre-procedural 3D image to verify alignment or determine any positioning error. Blumhofer does not teach or fairly suggest obtaining a first image at a position of the patient within said scanner wherein the anatomical target is located in close vicinity to said magnetic isocenter and the at least one fiducial marker is located further from the magnetic isocenter than the anatomical target and obtaining at a shifted position of the patient within said scanner wherein the at least one fiducial marker is located in close vicinity to said magnetic isocenter and the anatomical region is located further from the magnetic isocenter than the at least one fiducial marker such that the first and second images can be overlaid to create a composite image depicting both the tumor and the fiducial marker(s) all within the acceptably low geometric distortion tolerances for MR imaging.

Shepard et al. does not cure this deficiency. Shepard et al. is directed to a radiosurgery system to provide diagnostic imaging and target localization via a patient 3-D mapping means such as a CT scanner or MRI. Specifically, Shepard et al. teaches that the radiation source beam assembly incorporates multiple radiation sources which delivers beams of radiation that intersect at a point a particular distance from the isocenter of the treatment zone. It is respectfully submitted that neither Blumhofer et al., nor Shepard et al., nor the combination teach or fairly suggest taking a first and second image which can be overlaid to create a composite image depicting both the tumor and the fiducial marker(s) all within the acceptably low geometric distortion tolerances.

Accordingly it is submitted that independent **claim 11** and **claim 12 and 19** which dependents therefrom distinguishes patentable over the references of record.

Claim 22 calls for receiving a first MR image of a patient in a first position in which an anatomical target is within a FOV which is sufficiently adjacent an isocenter of a magnetic field used to generate the first MR image to have a preselected geometrical accuracy, receiving a second MR image of the patient in a second position in which a fiducial marker is within the FOV, the second position being shifted relative to the first position, and overlapping corresponding parts in the

first and second MR images to create a composite image in which the anatomical target and the fiducial marker are depicted with the preselected geometrical accuracy. It is respectfully submitted that neither Blumhofer et al., nor Shepard et al., nor the combination teach obtaining a first MR image where an an anatomical target is within a FOV and obtaining a second image second MR image of the patient in a second position in which a fiducial marker is within the FOV such that the first and second image can be overlapped to create a composite image.

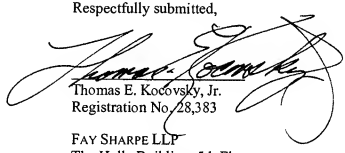
Accordingly it is submitted that independent **claim 22** distinguishes patentable over the references of record.

CONCLUSION

For the reasons set forth above, it is submitted that all claims comply with the statutory requirements. An early allowance of all claims is requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, the Examiner is requested to telephone Thomas Kocovsky at 216.363.9000.

Respectfully submitted,



Thomas E. Kocovsky, Jr.
Registration No. 28,383

FAY SHARPE LLP
The Halle Building, 5th Floor
1228 Euclid Avenue
Cleveland, OH 44115-1843
Telephone: 216.363.9000 (main)
Telephone: 216.363.9122 (direct)
Facsimile: 216.363.9001
E-Mail: tkocovsky@faysharpe.com